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For Users of Fillers, Shellacs, Varnishes, Etc.

APRIL, 1925

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No. 100

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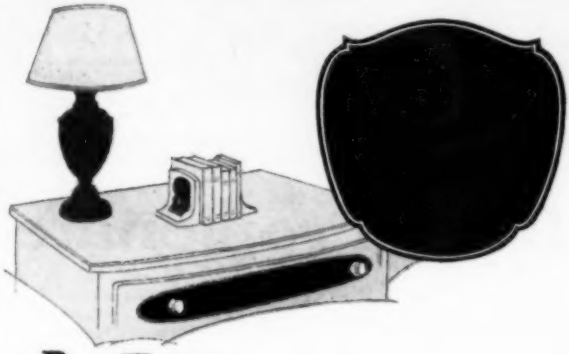

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Industrial Finishing

For Users of Fillers, Shellacs, Varnishes, Etc.

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CONTENTS FOR APRIL, 1925

With the Editor 5
Modern Spraying Practice—1, by R. L. Masterson 7
Applying Transfers 9
Test Panels Show Durability of Auto Finishes, by H. C. Mougey 10
What Constitutes a Good Filler, by Roy L. Knall 11
Keeping the Turntable Clean, by Thos. Bezzo 12
Finishing Wicker Furniture, by H. J. Turleman 13
Clean Up and Paint Up 15
Correction of Error 15
Finishing Equipment in Small Showcase Factory, by F. W. Worthington 16
Be Careful with Lacquer 18
Overcoming Shellac Troubles, by Paul T. Boehmer 19
Saving and Utilizing What Often Goes to Waste, by A. R. Boles 20
Violin Finishing, by K 21
Patching the Marred Finish, by Cliff Stanton 22
Editorial 28
Progress in Modern Finishing.
Learn From Your Visitors.
Tracing Down Troubles.
Appearances Sell.
Period Finishes—Wm. and Mary, by R. J. Meade 30
The Question of Glue Sizing, by Edwards 31
Turpentine as a Varnish Thinner, by G. H. Pickard 32
Lacquer Solvent News 38
Wet Sanding Liquid, by C. W. S. 38
Questions and Answers 40
Finishing Handles by Tumbling Method, by B. C. A. 41
Bleaching Basswood White, by L. K. G. 41
Staining and Filling Cheap Chairs, by J. C. Washbourne 42
Always Wash New Cheese-cloth Before Using, by P. S. Kennedy 45
Primers for Lacquer, by E. R. K. 45
Uniform Stains for Uniform Results, by Jules J. Thorne 46
Making up Formulas, by J. C. Werberg 47
Thinned "Blue Lacquer" as a Stain, by H. Schubert 49
Water Marks on Waxed Finish, by Moxite 49
Philippine Mahogany, by J. M. Reade 49

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With the Editor

IT is the aim of the publishers of INDUSTRIAL FINISHING to supply each month an attractive journal that is filled with practical information and suggestive ideas which will be not only interesting and useful to all users of finishes, but which will have a stimulating influence upon those who are responsible for production results—the foremen finishers of the world.

INDUSTRIAL FINISHING'S intention and purpose is to serve the industry without bias or favoritism. We assume that the majority of readers are busy men and that their time is valuable, therefore we plan and edit accordingly. We believe that the fair-minded men in the industry would object (perhaps silently and passively, but object nevertheless) to any other policy.

In this connection it is interesting and gratifying to us to read the following postscript on an article recently sent in by the foreman finisher of a large furniture factory: "I think INDUSTRIAL FINISHING the best of its kind ever printed. It gives the finisher the opportunity to express himself, and it brings out new and ever-welcome ideas. It is a great get-together of finishers." This foreman finisher enjoys reading what others have to say and he finds additional interest in submitting some of his own ideas for the benefit of others.

Another foreman finisher—a piano factory man—whose hat is also in the ring of contributors to reading pages, writes, "INDUSTRIAL FINISHING is a book to be proud of. I look for it every month, for it is a pleasure to read it. The right way to read it and get results is to start at cover and read to cover; not as so many do, an article here and there."

Now, these expressions of reader interest are fine, and it is not unreasonable to suppose that they are representative of what many others think. We appreciate this tribute and it makes the editor feel more than ever obligated to select editorial matter carefully and to edit it closely so that all of it will be worth reading. It is sincerely hoped that INDUSTRIAL FINISHING will continue to merit such expressions from its worthy readers.

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Modern Spraying Practice—I

This is the first of a two-part article in which the author calls attention to a number of fundamental points that apply at all times, regardless of kind of material used or other conditions peculiar to any particular kind of air brush work

By R. L. Masterson

THE variety of materials being applied with the spray gun is growing larger every day. It has been proved that there is a considerable saving in time through the use of the spray brush as compared to the use of the ordinary hand brush, in the application of most paint and varnish materials. Furthermore, the quality of the work is improved in many instances by the use of the spray. These points of advantage have led enterprising people to adopt the spray gun for the application of finishing materials on an ever-increasing number of objects, which heretofore have been coated by other means or, perhaps, not at all.

In addition to the application of long-known finishing materials to new uses by use of the spray, there have been developed a number of entirely new products which, at the present stage of development, cannot be satisfactorily applied by any process other than that of spraying. As efforts are made to apply new products by this process there is usually a logical development both in the materials and in the spray gun itself, so that eventually the problem is worked out quite satisfactorily.

As an illustration take the application of lacquers and lacquer enamels. Practically every manufacturer of spraying equipment has made changes in the design of his spray equipment to meet the new set of conditions arising from the use of these highly volatile materials and, no doubt, practically every maker of lacquer materials has also made slight changes in his products to make them more suited for spraying. By working together in this way a common meeting ground is usually found and good results are eventually secured.

In addition to this continual development in materials and equipment with which to apply them, the conditions in practically every finishing room vary, since the atmospheric conditions, the air pressure, the type of spray gun, the kind of feed, the type of coating material, the size and shape of the object, and many other factors, not the least of which is the man behind the gun, have a bearing on the results obtained.

Since the application of materials by spraying is in a constant state of development and since there are so many factors which influence the results, it is not possible to give, in printed form, any complete set of definite instructions as to how to get good results. What is good today for one set of conditions may be entirely obsolete tomorrow where the conditions have been changed.

There are, however, certain fundamental points which hold true at practically all times, re-

gardless of what kind of material is being applied or what the other conditions may be. These are given briefly in this article.

One of the most important requisites to good work is the choice of the proper type of gun and size of nozzle opening, to best apply the particular material at hand. A nozzle that gives perfect results with one material may not be at all satisfactory with another. This is because of the difference in viscosity, ability to flow, or level out, after striking the work, rate at which the volatile thinners evaporate and other factors which are entirely different in different types of finishing materials, or even in goods of the same general type but made by different manufacturers.

Another factor that must be considered, simultaneously with the choice of the proper gun and nozzle opening, is the air pressure to be used. The pressure must be varied, as a rule, depending upon the material used, the size of nozzle opening, and such factors. Air pressure at the nozzle may vary from 30 to 100 lbs. The correct pressure to use with a given gun, a given size nozzle, and a given material can be obtained only by the operator experimenting until the desired results are obtained. Once the correct pressure has been established for a given set of conditions, it can be relied upon for future use so long as none of the conditions are changed.

A general rule, with few exceptions, is that the more viscous or heavy in body a material may be, the higher the air pressure should be, and the wider the nozzle opening, to get good results. This does not hold true in every instance, however. Several types of materials will be discussed individually a little later.

The method of feeding the finishing material to the nozzle of the gun may be either by gravity or pressure. The syphon or suction system, sometimes used on small cup guns, is not best adapted for use where surfaces of any considerable size are to be coated. In general the pressure system is the best, as it insures a positive and uniform supply of material always available at the nozzle ready to be put on the work. The pressure on the material, of course, will have to be regulated to fit the other conditions, such as viscosity of material, type of gun, size of nozzle, etc., but in any case it is not wise to carry this pressure beyond 10 lbs. to the square inch or so, except in the case of certain spray guns which require the material to be under a pressure of 20 or 30 lbs. to the square inch.

Some shops use the steel drum in which the finishing material is received, for a pressure tank, spraying directly from the drum. When this is done, extreme care must be taken not to put more than 8 to 10 lbs. pressure on the drum or there will be danger of the drum bursting with a resulting loss of material and perhaps the loss of life. When the drum is used for this purpose it should be reinforced with a removable attachment to hold in the heads, and a safety valve, set to go off at not more than 10 lbs. pressure, should be used. Even then there is danger of the safety valve becoming clogged and allowing the pressure to go too high. It is safer to use either the gravity system or special tanks built properly to withstand as much pressure as may be on the main air line.

The gun should be held far enough from the work to secure proper atomization, but not so far as to allow too much of the volatile materials to be evaporated. If the gun is not held the proper distance from the work there is danger of getting a pebbled or orange peel effect, or there may be runs, sags and a number of other defects.

Where wooden objects are being coated, it is well to follow the grain of the wood; never zigzag over the work, for by so doing a very uneven coat is obtained. Whether the object is wood or metal, start at one end of the surface and go all the way across to the other end. Be sure to go beyond the edge of the surface before swinging back in the opposite direction, or there will be danger of piling up the material too heavily in some spots, causing runs and sags. Use an even, swinging motion, moving forward just fast enough to give a good, even, wet coat without sagging. Hold the gun at right angles to the work at all times and be careful not to pull it farther away from the work at an angle near the end of the stroke.

When the air gun is held at such a distance from the work that it seems to be applying a 6 in. wide spray, it really is covering solid for only a distance of about 4 in. in the center, 1 in. or so on either side being blended out. Therefore, in order to secure an even coat, it is necessary to lap over enough on the next stroke across to solidly cover this blended portion. With lacquer materials this sometimes means that about half the width of the spray will have to be overlapped on each stroke.

It is well, when applying certain materials which are none too strong in hiding power, to spray each coat at right angles to the previous one to prevent streaks of stronger color in some spots than in others. By this is meant that if one coat is put on from right to left the other should be applied from top to bottom, or up and down across the path of the spray in the first coat.

When spraying table tops or flat work, always start at the near edge and work away; this prevents blowing air over the surface already coated and assists in the flow. This is especially important in the application of lacquer materials, as otherwise there is danger of the over-spray settling on the coated work and giving a rough surface.

(To be continued)

Applying Transfers.

The Magnavox Co., makers of Radio equipment, describe the manner in which they apply decalcomania over crystallizing lacquer, as follows:

"Our method is to size the transfer with light varnish, thinned with turpentine, then warmed until the varnished surface is tacky. Apply and roll well with a rubber squeegee, tap and swab off with a wet cloth to remove the outer skin of paper, then wash off surplus varnish with kerosene and wipe with cheesecloth. We never coat over the decalcomania with anything.

"We add a wineglass full of linseed oil to about a quart of kerosene oil. This prevents the oil from burning the girls' hands."—The Hilo World, Hilo Varnish Corp.

The more quality you buy, the the less you will spend for finishing materials in the long run.

Test Panels Show Durability of Auto Finishes

Control Chemist of General Motors Research Corporation gives interesting facts on tests conducted for the purpose of determining durability of automobile finishes, in address before S. A. E. at Indianapolis, Ind.

By H. C. Mougey

WHEN we started our work on finishes for automobiles we found that the manufacturers of the different coatings had different explanations for the low durability of the finishes. Those who made undercoats, blamed the top coats; those who made topcoats, blamed the undercoats, and those who furnished a complete system, blamed the methods of application and drying.

In order to locate the causes of poor durability of ordinary automobile finishes, test panels were exposed on test racks on the roof of our laboratory.

The length of life of varnishes depends greatly upon the time of the year when the test panels are exposed. We made tests of the most durable finishing varnish we could obtain, and compared them with tests of an average finishing varnish. We found that both varnishes will last very much longer when exposed in the early winter than when exposed in the early summer. The reason for this difference in durability is that in Dayton, Ohio, where these tests were made, there was almost three times as many hours of sunshine in July as in December, and the maximum average temperatures, of course, vary correspondingly.

The panels which we exposed on our test racks were prepared in lap coats, that is, a portion of each coat was left uncoated in applying the succeeding coats, and thus the durability of each coat could be observed.

It was found that the primer and surfacing coats were very durable, even if unprotected with additional coats. It was also found that the durability of the color, rubbing and finishing coats, applied over surfacing coats, was the same as when they were applied over bare metal, thus showing that the primer and surfacing coats were both durable in themselves and satisfactory as a foundation for the other coats.

However, the color and rubbing varnishes were very low in durability, failing in from one to five weeks when exposed unprotected by finishing varnish. The finishing varnish is supposed to protect the color and rubbing varnishes of low durability, but the task is too great and the real reason for the short life of the ordinary automobile finish is the failure of the color and rubbing varnishes, which as they crack, take the finishing varnish along with them.

When a finishing varnish is applied over color and rubbing varnishes of low durability, it is apparent that if the finishing varnish should be removed in spots due to scratches, whether from dust or in cleaning the car or by any other mechanical in-

jury, the color and rubbing varnishes would be exposed without any protection at these spots, and if the color and rubbing varnishes tend to fail in a very short time when unprotected, failures will start at these scratches. This actually does happen in service.

The fact that a finishing varnish film is so easily scratched is one of the main causes of the early failure of paint and varnish finishes. A number of polishes are on the market with the claims that these polishes, in addition to giving a better appearance actually increase the life of the varnish film, acting either as a protective coating to the film, as a "varnish food", or as a "seal" which closes the pores of the varnish film making it more resistant to weather. We have made a large number of tests on different commercial polishes of many types.

Racks of test panels on roof of building.

In our tests we have always found a shorter life in the case of a varnish surface regularly polished. This is true even if the test panels are only regularly washed with water. Any of these treatments mechanically injures the varnish film and causes it to fail prematurely.

One of the polishes, which we have found to be as nearly harmless to the varnish as any, is a mixture of linseed oil with enough turpentine to prevent the application of too heavy a film of linseed oil. However, in the case of black baking enamel, or of other finishes which are hard enough to resist the effect of the polishes, we feel that such as cellulose nitrate materials, the regular use of a suitable polish is very desirable.

In addition to failure due to the mechanical removal, due to scratches of the protection offered by the finishing varnish, there is also the effect of the color and rubbing varnishes failing under the finishing varnish and taking the finishing varnish with them.

It appears that if the color and rubbing varnishes of low durability should be replaced with ones of high durability, a much more permanent finish could be obtained. Tests have shown that this is true, and an increase of from two to four times the life of ordinary production finishes can be obtained. This system is now being advertised by one of the largest varnish companies, and has been used during the past two years by manufacturers of some of the high-priced automobiles.

What Constitutes a Good Filler.

All finishers know the importance of good filling and the bearing it has on the subsequent operations. Probably some of the older readers remember the old methods and materials that were used before the discovery of the modern silex filler; and how repeated coats of drying oil were rubbed into the pores to fill them. Those methods would be prohibitive in this age owing to labor costs and production hinderance.

Today silex fillers are being used on practically all furniture, with possibly a few exceptions on cheap goods. Any whitings, starches, china clay, or any substitutes of silex are poor makeshifts for filler at the best. In this present day of production it would be suicide to resort to something short of a good filler which neither shrinks nor absorbs any of the thinners used to spread it on, for we may spoil enough goods, before our troubles are discovered, to purchase enough good floated silex filler to last a year.

I find naphtha the best thinning agent for my requirements, owing to its rapid evaporation and due to the fact that it leaves no foreign matter behind to hinder in drying. Filler should be stirred continually while you are applying it. After it has set up sufficiently it should be rubbed crosswise of the grain wherever possible. Here I might add also that the one applying the filler can help good filling by brushing his filler in well, crossing his work and working it out well. This helps to eliminate pin holes and it closes up air pockets.

Always see that the surfaces to be filled are thoroughly blown off good with the air duster, so as to remove all grit and loose particles from pores of wood. When wiping off filler, if it lifts or is crumbly, this is an indication you are short on binders. A half pint of japan to 2-gal. of filler is sufficient to remedy your trouble; or I have used the same amount of good rubbing varnish with good results.

All filled work should set at least 24 hours before coating, but there are very few of us who can spare the time and room for any longer period of drying than this. So after all, let it be emphasized that no matter what importance lies in the succeeding operations of the finishing process, see that you are getting a good filler, and that it is being properly applied, for here is our foundation and also the source of a great many of our troubles.—Roy L. Knall.

Keeping The Turntable Clean.

It has been my experience that the one way to keep the spray-booth turntable clean is to keep it covered with paper. This is especially so, when the operator is spraying articles that do not completely cover the turntable. Now it's one thing to cover the round table with paper, but quite another thing to fasten the paper onto the table neatly and securely, and in such a manner that the paper can be removed and replaced with new paper quickly and easily.

My method is to use an expansion hoop which fits around the rim of the table. This hoop is an ordinary iron hoop in three equal segments or parts; the three parts are joined by spring-wire coil springs, each of which is about 3-in. long. This hoop fits tightly around the table rim and it holds the paper securely in place.

Several sheets of paper can be put on at one time by spreading them out on the table, then laying the hoop over the paper and pressing both down over the edges of the turntable rim. When the top sheet of paper is heavily coated with finish, it can be torn off and a fresh paper surface is presented. The projecting edges of the paper are trimmed, of course to leave the table with a neater appearance.—Thos. Bezzo.

Finishing Wicker Furniture

Pointing out essential differences in materials used in the manufacture of wicker furniture and specifying the most satisfactory treatment for each one, with suggestions on two-toning and color scheme plans

By H. J. Turleman

WICKER is the general term applied to furniture which is of the woven rather than solid or veneered smooth type. The strands used in the cheaper grades are "fiber" which means coarse, tough paper twisted spirally to great hardness. The more expensive grades are of reed or rattan—vegetable products treated by steam to soften them for plaiting and braiding. While the finished effect is the same for both, the difference in character of the two grades is such that distinct treatments are necessary for each, alike for stain and enamel.

Staining Fiber.

Owing to the porosity of even the toughest paper it is necessary to apply a preliminary coating to fiber, which will cause it to hold out the finish. Before being woven into the piece the strips are glue-sized by dipping into a thin water glue, and allowed to dry for 24 hours. When this has been accomplished the strands are dipped in a water stain.

For a brown mahogany effect a stain solution of about 5-oz. Adam brown aniline dry powder to the gallon of hot water is used; for a light brown, 1 to 3-oz. of standard brown aniline; for light gray, 1-oz. Jet Nigrosene. The number and shades of possible stain effects is limited only by the proportions of red, brown, black, green, blue and yellow aniline powders used to the gallon of water.

The strands are next worked into the furniture shape and secured to the solid frame. As soon as the fiber is thoroughly dry the piece is given one spray or brush coat of white or orange shellac substitute according as the finish is light or dark. Pure shellac is not employed owing to its excessively brittle character, which would cause it to crack under strain and bring off the subsequent protective finish with it.

Within a few hours spray or brush on a coat of tough, pale, elastic, waterproof coach varnish, which will dry dust free in about three or four hours, and hard overnight with a full lustre. The next morning spray or brush on a second coat of the same varnish and when dry the piece is ready either for shipment or for frosting (two-toning).

Frosting.

Two-toning, as the trade term often goes, is accomplished with white lead is it comes from the keg, or colors ground in oil. These are thinned with naphtha and some linseed oil to fairly thin consistency, and brushed on all over. The oil serves the purpose of making the coating easier to wipe off, which is done as soon as the piece has been coated. The wiping is done with a muslin rag, which must be frequently turned to present a clean wiping surface. A strong pressure is not used.

The object of the wiping is to remove the pigment glaze from

all high portions of the fiber, so as to leave the white or color showing only in the crevices and deep parts. White lead is used in connection with gray stain, gray with brown, black with green—any combination that is harmonious will serve. Novelty effects are secured with bronze powders mixed with japan dryer and sufficient oil to assure easy wiping. Japan colors "set" too quickly and are therefore not employed.

The frosted finish is now complete, except that, it should be noted at this point, some manufacturers apply the second coat of varnish over the colors instead of under them.

Staining Reed.

The process is the same as for fiber except that no glue-size is used and the finishing starts after the piece is assembled. From staining on, the method is identical although it is often the custom to add a little alcohol to the water stain to aid penetration.

Enamel on Reed, Rattan or Fiber.

The fiber is first glue-sized as previously described, then worked into shape, but not the reed or rattan which are steamed and shaped without preliminary treatment. The first step is to brush or spray on one coat of flat undercoater tinted to the finish color and, in the case of reed and rattan, thinned with a little turpentine to aid penetration.

When this is dry it is not necessary to sand, but a very finely ground undercoater should be used. The following morning a second coat of undercoater, even more strongly tinted, should be applied followed the next day by a finishing coat of good grade gloss enamel. The piece is then ready to "band" or "stripe" with a harmonizing or contrasting color, about two days being allowed for the enamel to dry hard first.

Some manufacturers apply but one coat of primer and one of enamel; others one coat of primer and two coats of enamel; still others two coats of enamel only, the first coat reduced somewhat with turpentine. These variations depend very largely on the price received for the pieces and the amount of time it is desired to put into the finishing operation.

Two-Tone or Frosted Enamel.

Sometimes a contrasting two-color effect is produced only by applying an enamel of harmonious shade to the plaited band running along the front of the chair seat, over the arms and back, around the top of a table, around the feet or legs, or on a design set in the back or front of a chair or settee, or in a table top. Where a two-color effect by frosting is desired, the method is the same as that specified for stained wicker furniture with colors or bronze powders in naphtha and oil.

The enamel, however, must be hard dry to avoid blurring, and as this often requires a wait of two or three days the delay under production conditions is excessive. To eliminate this, special enamels are obtainable constructed to dry from the outside in, instead of the reverse, as is ordinarily the case. Such enamels can be safely two-toned or frosted in from 5 to 8 hours and will give fully as durable service as the standard type.

Favorite color combinations for two-tone or frosted enamel furniture include black (body color) and gold (frosting color) or black and silver, black and Chinese red, blue and silver, brown and light gray, green and black,

blue and white, ivory and blue, brown or red, olive and red, orange and black, cream and light blue, green and mauve, crimson and white, gray and silver, black and white, etc.

Clean Up and Paint Up.

"The Modern Crusader," pictured as a heroic figure on a charger, and bearing a shield with the motto "In the Public Service," will feature this year's national and local Clean Up and Paint Up Campaigns.

The "Modern Crusader" idea was presented to the National Campaign Committee by Allen W. Clark, chairman of the National Clean Up and Paint Up Campaign Bureau, St. Louis, at the January meeting of the committee.

The slogan and the symbol.

"It is this spirit, this desire to make the world a better place to live in," says Mr. Clark, "that undoubtedly has enlisted in this campaign during the past twelve years the many thousands of public spirited men and women and especially the young people, whose zeal and devotion have given this movement the magnitude and power and stability that amaze and often puzzle those whose thoughts are centered upon sales records and balance sheets."

Continuing, Mr. Clark said: "These crusaders of today, like those of medieval times, are virile, vigorous and perhaps more practical than their forbears. Their accepted mission invites neither the cynics, the shirkers nor the sentimentalists. 'Brighten up the corner where you are' is their idea of the individual duty and example incumbent upon each citizen and each community. Co-operation in this effort brings an increase in civic unity."

Correction of Error.

In March front cover advertisement of Innis, Speiden & Co., Inc., the address of The Wilbur White Chemical Co., manufacturer of Butyl Propionate was printed Oswego instead of Owego, N. Y. The Wilbur White Chemical Co. are in Owego, N. Y.

C. J. Schumann Honored.

Carl J. Schumann, secretary of the Hilo Varnish Corporation, Brooklyn, has been elected a vice-president of the Association of National Advertisers.

The Foreman Finisher's Job.

Every foreman finisher has found staining or coloring woods his most difficult problem, and though this is the most important part of the finishing process, he finds very little time to experiment.

A firm who can be of great help along this line is W. D. Lockwood & Co., because they have specialized exclusively in stains and dyes for wood for thirty years.

Their latest booklet is a useful guide, and finishers can obtain it by writing to them at 314 West 14th St., New York City, mentioning the name of their firm.—Advertisement.

Finishing Equipment In Small Showcase Factory

The smaller factories need modernly-equipped finishing rooms too, and here is a typical new installation in a southern showcase and fixture factory

By F. W. Worthington

THE space allotted to the finishing department in a certain new showcase and fixture factory, which is housed in a two-story building 60x150-ft., consists of a room 60x60-ft., at the west end of the second floor. In this 3,600-sq.ft. of floor space all new equipment of modern type has been installed. There is a drying room 30x30-ft. with a wood-ceiled ceiling 14-ft. in height, an 8x16-ft. spray booth, an air compressor motor driven, and two portable rubbing machines operated by air (one large size and one small size rubber).

The spray booth is extra large to make it especially suitable for showcase work. It is located in a corner of the room, as shown by the view in Fig. 1. A close-up of the apparatus just outside the right-hand or working side of the booth appears in Fig. 2. Referring to the devices near the top of this picture and reading from left to right, these are: The condensation and oil remover through which the air passes first to be cleaned, the air pressure regulators and air gages, the air heater, and the varnish heater. Both heaters are operated electrically, and while heat is turned on the fact is indicated by a small protected pilot light above each heater.

Fig. 1—The spray booth is extra large.

Fig. 2—The apparatus that the spray operator uses.

Below the apparatus just described in Fig. 2 is a 12-gal.

pressure tank mounted in a swivel caster base so it can be easily moved over the floor. The practice is to draw finishing material from the drums or barrels and pour it into this tank, thinning it if necessary to the desired consistency before using. The portable tank is rated to withstand a pressure of 150-lbs. A crank, projecting up through the top of the tank, is used for operating an agitator within the tank. The air pressure generally used for spraying here is 70 to 80-lbs.

The drying room was planned and designed by the service man of a prominent manufacturer of finishing materials. It is in the northwest corner of the building; it has two outside walls and two partition walls. The lower parts of the building walls are fitted up on the inside, as shown in Fig 3. Lines of steam coils are located inside the baffle board wall, which starts 6-in. above the floor and rises 4-ft. in height. The large pipes, which rise above the baffle boards and elbow through the wall of the building, are fresh air inlets. On the inside they extend down to within 6-in. of the room floor; on the outside they merely project out far enough to elbow straight down so as to keep out rain or snow and dust or dirt. There are three of them along the west wall and four along the north wall.

As originally installed the top pipe, of the several steam pipes behind the baffle board, was pierced at intervals to serve as a spray pipe to introduce the necessary humidity into the drying room. However, this proved to be unsatisfactory in certain respects and plans are now under way to obtain humidity through the use of water pans, which can be filled and drained by valves to allow

Fig. 3—Above: The baffle board behind which is located steam heating pipes, humidity equipment and fresh air inlets.

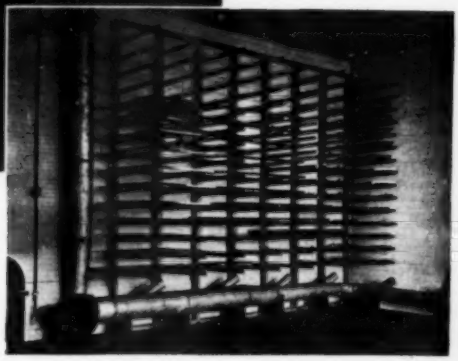

Fig. 4—Below: Some of the stationary drying racks, and the mechanical suction equipment for maintaining circulation of air.

proper regulation. Accurate readings of temperature and humidity are obtained by referring to dry and wet bulb thermometers within the room.

The chief means of promoting a circulation of air through the drying room is illustrated in Fig. 4. In this view the observer is looking toward the southeast corner of the room. The small fan is rated to run 1,140-r.p.m. with a 1/6-h.p. directly connected motor. The intake pipe is 10-in. in diameter at the fan, but it tapers down to smaller size, and it has eight suction openings, five of which appear clearly in the picture. The 10-in. vertical discharge pipe goes up through the roof. Stationary racks several decks high, above the suction pipes, are utilized for supporting doors, shelves, moldings and various parts that are finished separately from the cases and cabinets.

Be Careful With Lacquer.

In an address delivered at the Distributors' Convention, Hotel Commodore, New York, recently, E. R. Kyger said in part:

"We have had so many new and successful pigments and liquids introduced by the paint and varnish industry within the last twenty-five years that the radical departure from the oil enamel and varnish film as a protection and means of beautifying a wood or metal surface to the nitro-cellulose lacquer or lacquer enamel film has been taken by the general public with an abiding faith that speaks well for the high regard that our industry now holds in the public mind.

"Nitro-cellulose lacquers as now manufactured will do so many things and do them well, that there is a danger that through their very ability to serve and also through the extravagant claims of unthinking or misinformed salesmen that the public will be led to expect too much from them and so a natural reaction may set in and lacquer finishes suffer a temporary set-back. However, they are so much better than the older finishes on certain classes of work that there is no question but that they have come to stay and will gain in public favor as time goes by.

"This possible period of depression may also be fostered by some companies rushing into the market without knowing whether or not they have a product of standard quality. In fact we have already noted a reluctant attitude on the part of some superintendents of large factories to grant a demonstration in their plants on account of unsuccessful demonstrations by other companies.

"Another cause of criticism from the general public will be on account of mistakes in application in factories where the workmen are insufficiently trained or where durability is sacrificed to cost and speed, or use of improper materials for the particular work in hand.

"These stumbling blocks will of course gradually be worn away and we will then see nitrocellulose lacquers in their proper place in the world's markets."

Building An Addition.

Richards & Co., Stamford, Conn., makers of shellac, lacquers and chemicals, has recently awarded contract for the erection of a one-story tile and stucco addition to its plant on Ludlow Street. The building will be 80x340 feet, with concrete foundation.

Overcoming Shellac Troubles

Foreman finisher calls attention to the causes of some common troubles encountered in the use of shellac, and reveals a number of interesting facts on the prevention and remedy of such difficulties

By Paul T. Boehmer

SOME finishers complain about the shellac they use not sanding as it ought to do. Others complain because the shellac sets so quickly under the brush when applying it. Still others register a kick because white shellac turns cloudy under the varnish. There are reasons for each of these difficulties, and I will try to explain them so the trouble may be avoided.

Pure shellac gum dissolved in alcohol should sand smoothly and without gumming the sandpaper, provided it has had time to dry. If it gums the paper, the shellac is either not dry, or it is not pure shellac, or perhaps it has been dissolved in a wrong kind of solvent. Owing to the high price of shellac during recent years there is a strong temptation to adulterate it with cheaper gums.

The present high price of grain alcohol has led to the use of various substitutes as shellac solvents. Many of these are quite inferior. Pure grain alcohol for use in shellac is an economic impossibility. But what is known in the U. S. as "190 proof"—100 gallons of grain alcohol to which has been added 5 gallons of wood alcohol—is near enough to the real thing for all practical purposes. Avoid as far as possible the use of wood alcohol, venice turpentine, benzole and other adulterants.

There are many grades of shellac gum, just as there are many grades of shellac in the liquid form. The grades of shellac gum vary in price, as they vary in quality. Each grade can be used for something, but for pianos and furniture only the better grades should be used. The cheaper grades of shellac are quite suitable for coating iron pipes and other metal parts that have been rusted. Shellac neutralizes rust and prevents it eating into succeeding coats of paint. Of course I am speaking of pure shellac of low grade; not shellac that has been adulterated with rosin and other cheap gums.

The writer has always done his own cutting of shellac in preference to buying it in liquid form. In this way one is in a better position to know what he is getting. In Canada, the solvent that corresponds to 190 proof in the U.S. is known as Government Standard Methylated Spirits of Alcohol, and is sold exclusively by the Internal Revenue Department of the Canadian Government. Those buying it are under heavy bond not to dispose of any quantity of it except in mixture with a certain quantity of shellac.

Those who complain about their shellac setting quickly under the brush are, in all probability, using wood alcohol as a solvent. What is known as "wood alcohol" is not an alcohol, and never should have been given that name. It is usually a very poisonous chemical, and its fumes have been known to cause blind-

ness. Shellac, when dissolved in this chemical, sets much more rapidly than when dissolved in denatured alcohol; for this reason it is very difficult to make a smooth job in applying such shellac, and more time is consumed than when a good solvent is used.

The third complaint—that of bleached shellac causing the finish to have a cloudy appearance—may have its origin in either of two things; either in the shellac itself, or in the atmosphere in which the shellac is used. White shellac is made white by means of bleaching chemicals. Unless these chemicals are all thoroughly washed out before the shellac dries, a chemical reaction takes place which renders the shellac almost insoluble; some particles are rendered quite insoluble in the usual solvents. Keeping shellac in a warm, humid atmosphere hastens deterioration, and impairs its transparency.

The other cause of shellac clouding the finish is a humid atmosphere at the time the shellac is applied. Strange as it may seem, it is a fact that the alcohol in which shellac is dissolved has a strong affinity for water, and it will extract moisture rapidly from a damp atmosphere, if given an opportunity. Whether the shellac is applied with a brush or a spray, the atmosphere in which shellac is applied should be dry.

In sections of the country having frequent periods of high humidity, shellac should be applied in a room provided especially for the purpose, unless some means is available for controlling the humidity of the whole shop. In the absence of such control, some provision should be made in the shellacing room for relieving the air of its surplus moisture. This can be done by condensation.

If the room is steam heated in cold weather by means of pipes along the wall near the floor, the steam pipes can be used for condensing purposes in humid weather, by disconnecting them from the boiler and connecting them with the cold water pump, so as to run cold water through them. Such a system, for condensing the moisture in the air, would require a drain pan below the pipes to catch the water and carry it away.

A condensing system in the shellacing room would naturally lower the temperature. It is possible that there would be times when both heating and condensing should be going on at the same time. In sections of the country where this is apt to happen, it would not be practical to use the heating system for condensing purposes. Neither would it be practical if the heating pipes were overhead. In such event, condensation could be taken care of by placing a couple of radiators in the room, and running cold water through them.

Saving and Utilizing What Often Goes To Waste.

There is need of but very little waste in the modern finishing room. I have worked in factories where there would be from 10 to 15 gallons of varnish, and such like, go to waste every year. This is unnecessary. All fat varnish can be used, by first cutting it with turpentine or gasoline, to coat the insides of drawers, shelving, the backs of cabinets, or the insides or parts of any articles which do not require real finish, but rather a protective coating to prevent warping. Fat varnish can also be used in thinning paints, by adding a little linseed

oil along with the turpentine or gasoline.

Save the filler also when through using it; pour it back in the large container. Put your brush in the bucket and pour in raw linseed oil to cover the brush well, so that when you need it again it will be nice and soft.

There are lots of ways of saving materials in a finishing room. For instance, when your water stain becomes dark from standing, which it always does, add a little water; don't dump it in the sink, as I have seen many a gallon go that way. By being careful and watching a little the head finisher can save many a dollar for the firm in a year's time.

When you have a job of varnish to chill, you can save it by taking a soft brush and a cup of wood alcohol or denatured alcohol and flowing the affected parts heavily with this. It sometimes takes as many as three coats if it is badly chilled. Let stand three or four days; it can then be rubbed, and it will look as good as any job, thus saving considerable time and material.

If the orange shellac has turned dark, add a teaspoonful of oxalic acid crystals to each half gallon. This bleaches it back to its natural color at once, and doesn't harm it in the least.—A. R. Boles.

Violin Finishing.

It is said by those who have studied the subject that the ancient violin makers, some of the most famous having their signatures in facsimile with date on the insides of many three-dollar instruments (the writer uses one such) used a varnish that was made from fossil amber. The varnish was colored, not the wood, as many suppose. There was wonderfully golden-hued yellows, golden amber, golden orange, light golden red, dark ruby red, deep blood red, reddish amber, golden brown, reddish brown, both medium and very dark shades. It was all a matter of color preference, for the color had nothing whatever to do with the instrument's tone.

The wood was first of all made smooth with sandpaper; then a coat of very pale varnish was applied, this being rubbed into the pores of the wood. After a week another coat of the varnish was applied, this being rubbed down and polished. Then from two to five coats of colored varnish was applied, the number of coats determining the depth of color. Good work demanded about three weeks' work, while a perfect job would call for a much longer period of time. The varnish dried slowly, hence it produced a very tough finish and a very durable one too. It was said that when the varnish dried too rapidly it impaired the tone of the violin. I presume that the one that I am using dried in one hour or so.—K.

Lilly Varnish Co. Plan New Plant.

The Lilly Varnish Co., Indianapolis, Ind., will build a factory to cost more than $50,000 on the property owned by the company at 670 So. California street, it was announced recently by W. I. Longsworth, secretary of the firm. He said that the total cost of the new plant, including fixtures in the building, will be in excess of $100,000.

The new structure will be four stories in height and will be constructed of reinforced concrete. The building will be used for the manufacture of enamels and nitrocellulose lacquers. The firm formerly was owned by the Lilly family of Indianapolis, but was sold in 1921 to C. M. Malott, C. F. Brigham and Mr. Longsworth.

Patching the Marred Finish

Regardless of all the care taken to avoid marring the finish on furniture, some varnished and enameled surfaces are scratched or dented, and the damage must be patched to last and look like new

By Cliff Stanton

MANUFACTURERS have found that by conducting a campaign of instruction in the finishing room and in the crating and shipping departments, the complaints from customers relative to scratched and marred surfaces are materially reduced. But there is one place where surfaces are marred which is beyond the control of the manufacturer; that is the retail dealer's uncrating floor.

Many times I have seen case goods set down, none too gently, at the rear of a furniture store by a couple of husky laborers who later attacked the crates with a claw hammer and wrecking bar, giving no thought of how the crate was put on. Their only job was to extricate the case as soon as possible. Such methods often result in serious damage to the case, necessitating its return to the factory for repairs, or to some furniture repair shop to have the finish patched.

If the dealer would take a little time to instruct his packing room hands in the art of uncrating, much of this trouble would be avoided. Better still, he could call on the furniture factory salesman to go back to the warehouse and instruct the warehouse men how to uncrate his furniture. Salesmen for the leading furniture manufacturing companies are so well trained today that they know every step in the manufacture of their goods, and they would welcome this opportunity to serve their trade.

In spite of the foregoing precautions, however, there will be a certain amount of patching necessary between the uncrating floor and the display floor.

On transparent finishes like American walnut, French walnut or mahogany, where the varnish has been broken, the surface can be repaired by the "burning in" process, which is as follows:

If the white wood shows it must be stained to match the other surface. The dealers can either get stain from the manufacturer of his furniture, or he can get standard stain and cut it to match the piece in hand.

The dent must be filled up level with the surrounding surface with stick shellac of the proper shade. This stick shellac for patching is put up in about forty different shades and can be purchased through any good finishing-material jobber.

To manipulate the shellac, a small alcohol burner is needed to furnish heat, and a small flexible pallette knife is used to cut the shellac. The knife is heated and with it the shellac is worked into the dent until the scar is filled up a little higher than the surrounding surface. During this process care must be taken to avoid marring the varnished surface around the scratch, with the hot knife.

After the wax has been built

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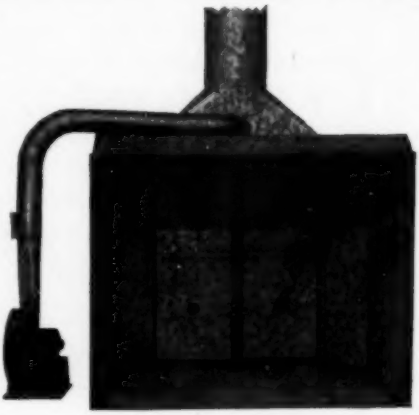

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up to the proper height, it can be smoothed off even with the surrounding varnish with a sharp putty knife, care being exercised to preserve the varnish surface. The next operation is to rub this wax down to a true surface with a felt rubbing block moistened with paraffine rubbing oil and No. FFF pumice stone. Here again, care must be exercised to avoid rubbing through the varnish surrounding the spot which is being patched.

The next operation is to polish the patch. This is done by taking a wad of cotton about the size of a hen's egg and forming it into a pear-shaped mass. This is wrapped in several layers of soft cotton cloth or cheese cloth, making a soft rubbing pad. The rubbing material is thin clear shellac, either orange or white, depending upon the shade of the finish being matched.

The shellac should be made in the proportion of one pound of gum cut in one gallon of denatured alcohol. The cotton core of the rubbing pad should be saturated with this shellac. The cover can then be stretched back over the cotton core. A slight pressure on the pad will bring the shellac through the cloth, making it ready for use.

The next operation is to place a drop of linseed oil on the patch. This is very necessary, but too much oil will ruin the whole job. A single drop is plenty for all ordinary patches.

After the oil is applied you are ready to begin polishing in. Begin by barely touching the surface with the pad. If the patch is on a flat surface, the direction of the stroke should be a figure eight. If it is on an edge, rub the whole length of the surface. Care must be exercised to keep from piling too much shellac on the surface. Practice alone will teach the exact pressure to use on this rubbing pad.

As the rubbing progresses the shellac will be gradually drawn out until it is all used, but the rubbing should continue until the desired polish is obtained.

This is an operation requiring practice, and it cannot be done in a few minutes; however, it is not a difficult job to learn, and there is no reason why every furniture store could not have an expert patcher in its packing room force.

If it is desired to keep the rubbing pad for more than one job, it can be kept in any air-tight container in which there is a little alcohol.

In case of enamels, these are so difficult to match that the safest way is to send to the manufacturer who made the piece of furniture in question, and get a small amount of the original enamel.

The marred place should be built up with wax of the proper shade and then the surface covered with the enamel. After drying, the surface can be rubbed out with oil and pumice stone.

In the case of repairs to hand decorated furniture, it is too much to expect that any ordinary finisher could repair this satisfactorily. Sometimes it is possible to get a local artist or furniture decorator to make the repairs. A fertile source of artistic talent is often found in the city high school. As a matter of fact, it would pay all furniture dealers and manufacturers to make the acquaintance of the High School Art Department in their city.

The development of apprentices is a vital problem.

Industrial Finishing

PRACTICAL PUBLICATIONS, Inc.
Publishers.
210 Holliday Building
Indianapolis, Ind.

Issued monthly. Distributed exclusively to executives and foremen finishers in all kinds of industrial plants where finish coats are applied.

APRIL, 1925

Progress in Modern Finishing.

There is a slogan now well known throughout the United States to the effect that if you "save the surface, you save all." That is to say, if there is a good surface we may trust that what is under it will maintain a state of preservation and so offer an invulnerable front to the enemy, which is usage under many different conditions.

There never was a time when more attention was given to this matter of surface finish, not only in the finishing room, but in the laboratory. Finishers and chemists are constantly working to improve upon what has already been done. One must be on the alert to keep up with the progress of modern finishing. It is unlikely that the time will ever come when no further advance can be made in this work. We are seeking improvement upon present excellent methods, and aiming toward perfection.

One of the most important inventions that has come to the finisher is the spraying machine, the chief merits of which consist of more rapid work, and in many cases a better finish than could be obtained with the brush. Spraying is more economical than brushing. Thus the spray system may be awarded three important merits of distinction. But even in its present excellent capacity for fine work there will, no doubt, be improvements made in it, some of its present features perhaps being eliminated or modified for the better.

Learn From Your Visitors.

The finishing foreman who extends a friendly greeting and the hand of welcome to outsiders who are interested enough to visit his department and talk to him, is to be congratulated. By so doing he places himself in position to obtain suggestions which may lead to something of great value to himself and to his concern. Every visitor, of course, may not be a gold mine of information, but some of them are sure to drop hints or suggestions of value.

It is the suggested ideas we receive that often set us thinking. The result of this thinking may develop a better way of performing some productive operation, a means of saving some material or supplies, or a way to overcome some difficulty that is interfering with production or hindering the maintenance of a desired quality. The visitor, with his background of personal experiences and contact with others, will see your department and its activities in a different light than you can possibly see it.

Invite him to look around. If it is possible that you have something better than anything he has ever seen, it's to your interest to know it, just as much as it is to your advantage to find out if someone else has something

better than you have. Some finishers "get wise" to one good thing and in attempting to conceal it they shut out opportunities of learning something better, as well as learning scores of other good things that might come their way if they would permit it. Nothing is so good but what it can be improved or replaced with something better.

Tracing Down Troubles.

Any finisher who has had a wide experience knows that the local conditions of a plant and its product, and possibly some phase of its policy, exercise an important influence upon what the finishing department can do and how it must function to accomplish the desired results. Materials that prove satisfactory when used under certain conditions in one plant do not always come up to expectations in another plant manufacturing the same product. It may be due to differences in temperature, humidity, ventilation, methods of handling, applying or storing goods, the personnel of the crew, or it may be something about the goods in the white.

Materials must be selected and methods developed to suit conditions. To do these things intelligently the finishing foreman should have all the information available that he or his concern can obtain or command. The sources of information available are his trade journal, consulting chemists who specialize on finishing room problems, and the service departments of one or more manufacturers of finishing materials and finishing-room equipment.

Consulting chemists and those individuals connected with the service departments of material and equipment manufacturers are accustomed to solving difficult and unusual problems. If they are allowed to make a complete survey of the finishing department and a study of all conditions entering into and affecting production methods, they will generally discover the cause of any trouble that may be present. The outsider making such a survey takes nothing for granted. His analysis includes an investigation of everything, and as a result the cause of the trouble may be discovered where those familiar with the plant least suspect it.

Appearances Sell.

The fact that the outward appearance—the style and finish—sells the article of today is apparent everywhere. In popular magazines, for example, the attractive cover exercises a great influence on the newsstand and solicitor sales. Some magazines have enhanced the attractiveness of their brightly colored covers by giving them a thin coating of clear varnish—an interesting though somewhat expensive process.

A manufacturer of automobiles, through a survey covering 250,000 prospects, has found that of all the buyers wants, style, beauty and finish head the list. Other things being equal, the article that excells in these characteristics will sell itself in competition with all others. Today competition is largely an affair of design and finish. The color harmony and finish of an article carry a greater responsibility than ever before, and as a result more attention must be directed to this phase of the manufacturing process.

Period Finishes—Wm. and Mary

Outstanding characteristics of the William and Mary style of ornamentation, and how the modern oak and walnut furniture of this style should be finished to produce various antique effects

By R. J. Meade

THE Dutch influence in English furniture making opened with the expulsion of the intriguing James II and the summons from Holland of William of Orange and his wife Mary to act as joint British sovereigns. Notable among the adaptations brought over by them and their courtiers were the inverted cup and bell on chair and table legs, elaborate marquetry work and oriental designs in gilt on back grounds of black, red, green and blue lacquer. The latter two had become popular as a result of trade contact with the Dutch East Indies.

The period was a short one, but so significant was the style that it has enjoyed repeated revivals, the most recent of which was some ten or fifteen years ago. The finishes were chiefly oak or walnut waxed directly on the wood or rubbed in the same manner with hot linseed oil, with legs gilded or painted in harmony with upholstery colors.

The modern finish for walnut requires a stain made up of about 4-oz. walnut crystals and ½-oz. of jet nigrosene to the gallon of hot water. It is high lighted by sanding with fine sandpaper around drawer pulls, on bun feet, cup and bell turnings, moulding corners, etc. No filler is used; for protection a coat of shellac and wax, or flat lacquer or flat varnish is customary.

An oil stain may be employed providing the final finish is not lacquer, and this may be highlighted by wiping while the stain is still wet. Oak calls for the same treatment, the oil stain being of the well known Jacobean shade. Wax is more popular on oak than either flat varnish or lacquer.

William and Mary chest of drawers.

Mahogany calls for a dark brown antique water stain—Adam brown 4 or 5 parts and 1 part nigrosene to the gallon of water, will serve the purpose. This is followed by a brown or red mahogany filler and, for a varnish finish, a coat of shellac and two coats varnish rubbed dull. For lacquer, thin the first coat about 50 per cent with reducer and follow with two coats medium body rubbed dull. The

mahogany finish calls for no highlighting, and shading in deep parts is optional.

If desired to execute Chinese lacquer effects on the panels of walnut or mahogany cabinets, apply first a ground coat of flat undercoater or primer tinted to the ultimate enamel shade. The undercoater should be very finely ground and require the minimum of sanding to render it smooth. The sanding is followed by a coat of enamel which may be black or of a reddish brown, bluish green or orange red color.

The raised figures in the oriental design are produced by applying layers of mixed whiting and water glue until the desired "raise" or embossed effect is attained. To them, gold leaf may be applied or dry colors mixed in shellac or aluminum bronze. Often the first and third are employed, and the surface is touched up here and there with vermilion or chrome green in japan. The whole surface is then coated with flat varnish or shellac and flat lacquer to give the desired mellow antique effect.

The Question of Glue Sizing.

The article in the February issue of INDUSTRIAL FINISHING brings up the above question, as many manufacturers object to glue sizing on account of bad results blamed on it and care required in using it.

However, if you stop to think of it, in the old days of the general use of hide glue in laying veneers, every manufacturer who sponged his work before sanding was actually glue sizing whether he realized it or not, and no bad results ever came from it.

In laying veneers with hot hide glue, as was always done, the hot glue was very penetrating, and the hot zinc cauls laid on top of the veneer brought the glue through the pores of the veneer to the surface. If this is not true, why did we grease the zinc cauls. Then, when these veneers were sponged with water, it dissolved enough of this glue in the pores to actually make a glue size automatically. This did two things: first it set the fibers or whiskers so they would cut off clean when sanded; second it took enough of the glue out of the pores so the work could be filled.

If you will look at a piece of stock veneered with hide glue through a magnifying glass, you will find the pores are so full of glue that if it is not sponged you can not get a good job of filling. Or, wet your finger and rub over it; you will find it becomes stickly as the glue cuts up. In laying ovals or ogee mouldings, many workmen dip the veneer in a glue size before laying, and I never knew of any bad results from it.

With vegetable glue, now so generally used, the veneer, core stock and cauls are cold, and about all the clamps do is to hold the veneer against the glue until it is set. All that comes through to the surface of the veneer, is moisture. This is shown by the fact that the use of vegetable glue requires wood cauls for best results, as they take the moisture from the surface. If zinc cauls are used, the work comes out of the clamps wet and sweaty.

Veneer laid with vegetable glue, therefore, is just like it was before it was laid, with nothing in it to hold or set the fibers or bind the edges of the pores, as is the case with hide glue. For that reason it is my experience that the use of a glue size is desirable on veneers laid with vegetable glue,

just as it used to be present automatically with hide glue.

Just to sponge with water, where vegetable glue has been used, is in my opinion almost a waste of time, because in sanding afterwards you can't tell the depth of the sponging and if you sand below this, your work is in the same condition as it was before.

You often hear that mahogany veneers are more fibrous and whiskery than they used to be, which I believe is caused, on certain grades anyhow, by the fact that in the days of hide glue the whiskers were sanded off, and now they are not, for the above explained reasons.

I am of the opinion that on mahogany veneers especially, where vegetable glue has been used, a glue size is necessary. For dipping I prefer to use dextrine, as water stain does not cut it up as it does glue size. Use about 8-oz. of dextrine to a gallon of warm water.—Edwards.

Turpentine As a Varnish Thinner.*

Varnish is a very complex body. Perhaps the greatest advantage of turpentine over mineral thinners lies in the stronger solvent power of the product of the pine. In varnish this power is very important, for the gums, treated oils, and driers must be held together as a homogeneous liquid. They vary greatly in the ease with which they are dissolved. It is essential to employ as a thinner a liquid with a high solvent power.

Turpentine is undoubtedly a better solvent in varnish than are the petroleum products, not only because of its greater solvent power, but also because of the nature of the solution it makes, or perhaps better because of the manner in which it thins the bases. With some gums it is absolutely necessary to use it as at least a portion of the thinner. With certain heavily cooked or blown oils it is much better because of a lessened tendency toward the separation of these materials from solution. Turpentine also causes the finished product to brush with greater ease.

What we mean by a varnish base is the mixture of treated oils, gums and driers which comprise that portion that remains upon the surface to which the varnish is applied. In other words, it is the portion which does not evaporate.

It frequently happens that when the same base is diluted or thinned with turpentine that a fuller, more lustrous and smoother coat will be obtained than if petroleum products are employed. Also because of the way the turpentine dilutes the mixture the varnish will brush more easily and flow better and sometimes wear longer than if petroleum products are employed.

Paint specialities are generally products that employ pigments and varnishes together. In other words, instead of being a paint with oil and pigment mixtures, the pigment is employed with varnish or varnish-like liquid as a vehicle. Enamels are typical of this class, though one must stretch the imagination a little to call a bodied oil, which is the vehicle generally used with the best enamels, a varnish.

One important property of a

*From an address delivered at the Second Naval Stores Conference at Savannah, Ga.

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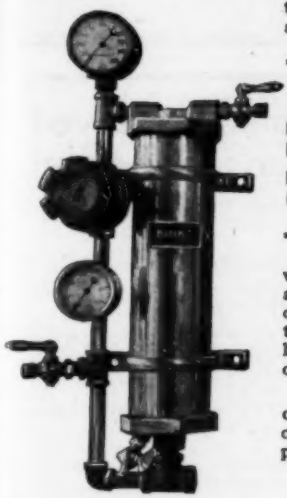

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high grade white enamel is that it must yellow to the minimum extent during age. Some petroleum thinners affect the degree of yellowing, either through their action previous to evaporation, or through the leaving of a residue in the film. Some can be used in enamels without bad effect, while others can not. Turpentine does not seem to increase yellowing at all.

From what has been said it is apparent that, generally speaking, turpentine is a better all-around material to use as a thinner in protective coatings than are the petroleum products. This undoubtedly sounds good to you, who are interested in the production and distribution of turpentine, but this is but a part of the story. While all true, it must not be interpreted as meaning that turpentine is the only thinner that can be used with satisfaction.

With the advance in the science and art of paint and varnish manufacture, the possible avenues for the use of petroleum thinners has been greatly increased, and this without detriment to the finished product. Thus it is clear that turpentine has the keenest kind of competition within the industry that consumes almost all that is produced. The competition is sharp because petroleum products are all much cheaper than turpentine has been during the last few years, and probably ever will again be.

Petroleum products are dependent upon the care with which they are manufactured for their uniformity of action. Refining and distillation processes must be very carefully carried out and controlled.

Much time, money and brain power have been spent upon the processes by which crude petroleum is converted into the various finished products of the industry of which volatile thinners are but a part. Consequently the early difficulties growing out of the use of this material have been eliminated to a very great extent with the natural result that petroleum thinners can be used for many purposes with entire satisfaction, especially where solvent power is not of paramount importance. This is particularly so in the whole list of protective coatings not classed as the highest possible grade.

Even in some of those products designed to give the very best of service petroleum supplants turpentine, at least in part. Take the case of flat wall finishes, for instance. In their application large areas are coated within confined spaces with a liquid containing a high content of volatile material. Consequently much vapor is in the atmosphere. Painters in general complain less of the effect of the vapors from petroleum thinners than those resulting from the evaporation of turpentine.

A recent turn in the manufacture of protective coatings which influences the market for turpentine is the very recent great increase in the volume of lacquers that is being produced. These lacquers are made from nitro-cellulose, that is nitrated cotton, gums and solvents. Turpentine is not one of the list of solvents used.

When you consider that not a drop of turpentine is used in lacquers, and when you consider that a good lacquer is comparable to the highest type of varnish and enamel, one can not help but wonder what effect this addition to

the list of widely used protective coatings will have upon the turpentine industry.—G. H. Pickard.

Lacquer Solvent News.

Recent developments in modern finishing whereby lacquers are being applied to wood and metal surfaces, have given impetus to the development of many new and interesting solvents. One of these solvents is known as "butyl propionate."

According to Mr. Bridgeman, of Innis, Speiden & Co., New York, "butyl propionate" has been known for some time, but its first production on any commercial scale, was undertaken by Leon S. Finch, of Los Angeles. Mr. Finch's work and interest in this particular solvent was due to his desire to utilize the residues of the Hercules Products Company's kelp operations during the war.

Recently a new process, independent of the kelp salt residues, has been developed for the commercial production of propionic acid, for which raw materials are available in appreciable quantities.

"Butyl propionate" is manufactured by the usual esterfication process, and due to the fact that the purity of propionic acid and butyl alcohol can be readily controlled, the resulting ester is of uniform quality. The physical characteristics of "butyl propionate" place it in the category of a high boiling solvent.

The "butyl propionate" which is available at present contains about 7 per cent. of butyl butyrate, which accounts for the boiling range of the material above 146 to 163 degs. C. The presence of butyl butyrate gives additional slower drying properties. The fact that butyl propionate dissolves practically no water and has a slow evaporation rate, assists materially in making a lacquer in which it is used resistant to blushing or blooming. There is also available at the present time, a grade of "butyl propionate," which contains no butyl butyrate, which is used in the manufacture of wood lacquers. This grade has a boiling range of 120 to 150 degs. C. and 70 per cent. will distill between 140 and 150 degs. This grade is somewhat more expensive, due to its purity. Its use for wood lacquers is due largely to the fact that it dries more rapidly.

Wet Sanding Liquid.

To appreciate the importance of a proper sanding liquid, it is necessary to know the circumstances in water sanding that have arisen with the growing use of lacquer. Water does not work the same on lacquer as on varnish. Lacquer has a tendency to pack or fill the cutting surface of sandpaper under conditions where varnish would rinse off clean. This inclination to pack not only produces a slower cutting and shorter lived paper than as though the grit were kept clean, but also changes a uniform abrasive into one where abrasive action is spotty. The result is almost sure to be surface streaks and scratches.

To overcome this condition automobile finishers have resorted to various liquids other than water in an attempt to obtain the same rinsing effect on lacquer as water has on varnish. The trouble is, however, that of the ways in which a liquid can accomplish this, the one most com-

monly adopted—because it is most easily obtained—is the least desirable. The medium generally used is gasoline or benzine. This is successful in keeping the sandpaper clean because it is, to some extent, a solvent of lacquer. Although gasoline or naphtha is not a true solvent of straight nitrocellulose it does, nevertheless, have a softening effect on lacquers as prepared for automobile use. Its effect, to resort to a homely illustration, is somewhat like that of cutting butter with a knife that has been heated to prevent the butter from sticking to it.

The tiny particles of lacquer cannot pack between cutting grains of gasoline-covered sandpaper, because the gasoline commences immediately to dissolve their surface, making it slippery rather than clinging. But while it is doing this to the removed lacquer, the gasoline is doing the same thing to the entire lacquer surface being sanded. It is also working into the texture of the sandpaper and robbing it of qualities it should have to successfully sand lacquer.

So much for "thinners." There is in some instances a resort to the use of heavier oils, but the danger involved to the ultimate appearance of the finish, unless they are thoroughly removed by gasoline or some other thinner harmful to lacquer, should keep them outside the consideration of possibly successful sanding liquids.

In this connection it is interesting to learn that there has been developed for wet sanding of lacquer finishes, a special sanding liquid which in working form is 24/25 pure water. Its action on lacquer is identical with the action of ordinary water on varnish. It does not melt or dissolve the lacquer slush from between cutting grains of sandpaper, but washes it out. It does not penetrate the lacquer or the sandpaper. It gives the cutting surface the keen, lubricated qualities needed to sheer down spray marks rapidly and evenly. It is as non-inflammable as water, as harmless to the operator's hands, and it is inexpensive.—C. W. S.

After a brief discussion recently, the Pittsburgh Paint, Oil and Varnish Club went on record as favoring the selling of linseed oil by the pound instead of the gallon.

A. I. P. Co. Increases Capital Stock.

The Allied Industrial Products Co., distributors of pumice stone, rotten stone, felt, steel wool and sponges have increased their capital stock from $30,000 to $75,000, this change having taken effect on March 13. The officers still remain the same, namely, C. J. Cahill, president; J. J. Lawler, vice-president; R. W. Conlin, secretary and treasurer.

A Versatile Product.

A most useful stain for many purposes is Number 5279 Loutre Brown Powder, soluble in water, because by varying the strength of the solution it can be used on different woods,—gum, walnut, mahogany and even oak for the Italian brown effect,—with splendid results. It saves a lot of time to use one stain for so many purposes.

Any foreman desiring to try the stain can write to W. D. Lockwood & Co., 314 W. 14th St., New York, for a sample.—Advertisement.

Questions and Answers

This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers

Who Manufactures Painting Machines?

We are wondering if you can put us wise to a painting machine in which sticks of wood are fed in, and are either shellacked or varnished in a mechanical way?—J. M. Co.

How Should Varnish Remover Be Used?

Kindly tell me how to use varnish remover to get best results. —R. B. F.

How Are Brush Blocks Finished?

We are manufacturers of brushes and our process of finishing our brush blocks is too slow for any of our lines except the highest grade goods. We are wondering if this is done on a lathe—in the case of turned handles?—H. S. & Co.

What Finish For Ice Boxes?

We specialize in the manufacture of ice boxes and meat display refrigerator cases. At present we are using one application for the interior finish in the walls of our ice boxes. This has proven to be unsatisfactory, due to the fact that this shellac would soon wear off or chip off. Then the wood absorbs a certain amount of moisture, especially in the doors and jambs, and we have had quite a bit of service on same.

We have taken up the matter with local chemists and they have advised as follows: Spar varnish, high-class floor varnish, waterproof shellac with a certain percentage of benzole added, etc. Manufacturers and local dealers have recommended one thing and another, each one claiming his article will do the work. Now, we believe what we are after is some finish that will dry quickly, look like varnish, and absolutely close up and seal the pores —something that will penetrate and not wear off quickly.—N. S. F. Co.

What Varnish For Fiber Trunks?

We manufacture fiber trunks but do not get the proper finish on them. Would like to know where we can buy a varnish like or similar to what eastern trunk manufacturers use.—Midwest T. & B. M. Co.

What Stains or Preliminary Treatment For This Peculiar Wood and Nitro-Cellulose?

Some years ago we introduced the spray method of finishing, but have never been able to overcome some of the difficulties which seem to bristle round the subject.

Setting aside the question of cost as compared to the ordinary rubber work with shellac polishes, which has been English practice for many years, we are chiefly

in trouble in the matter of oil stains. We find it necessary to use oil stains as against water stains in order to avoid pulling up the grain after sanding. This applies particularly to finishes on our "maple", which may be described as a woolly kind of mahogany. Maple is not its botanical name, but it is known here as maple.

This particular wood is largely used, and we stain it a variety of reds and browns. Oil stains seem uncertain in their action, and sometimes seem to react with the coats of finish and discolor them. Matching earlier work at a later date also presents many difficulties.

Perhaps some system of standardization of stains might overcome this to an extent, but there are always the varying timber specimens to reckon with, which seem to take a given stain differently.

The fact is we have been so long used to the simple chemistry of water stains and shellac that the complexity of the amyl acetate and nitro-cellulose compounds plus aniline oil stains is a bit over our heads. Any suggestions or information will be very much appreciated.—B. W. & Co., Ltd., Sydney.

What Methods and Finishes For Hollow Steel Doors?

We are particularly interested in methods and materials used for enameling and finishing metal work, as we manufacture hollow steel doors and trim for buildings and railroad coach work.—L. S. Co.

Theodore Roosevelt once said: "Every man owes some of his time to the upbuilding of the profession to which he belongs."

Finishing Handles by Tumbling Method.

In the March number of this journal C. H. & T. Co. ask for information regarding materials to use in connection with small handles for finishing by the tumbling process, and in reply would say that some use sand, and others use sawdust. The former does the work much more quickly, but the latter is equally effective in other respects. This method takes the place of sanding.

If the handles are not to be varnished it will improve their appearance considerably to put a number of small pieces of paraffin wax in the tumbler along with the sand or sawdust. However, this must not be done if any other finishing material is to be applied, as varnish and similar finishing materials will not take over wax.—B. C. A.

Bleaching Basswood White.

Replying to L. M. Co. regarding the question of bleaching basswood, there are several ways of bleaching woods, and each method is a favorite with someone. A good bleach is made by dissolving oxalic acid in hot water, in the proportion of 4-oz. of oxalic acid to 1-qt. of water. Apply the solution with an old brush, or a swab. Several applications of the solution may be necessary before the desired whiteness has been obtained. When the last application of the solution has been made the surface must be washed off thoroughly with clear, hot water to remove all the acid from the wood; if allowed to remain, it is very apt to injure the finish.

Another good bleaching agent is a ten-per cent solution of hydro-sulphite of soda. This is

sometimes more effective than is the oxalic acid solution. It may require several applications to produce the desired degree of whiteness, but there is no bleach that will do the work at once. This solution has one advantage in that it does not necessarily have to be washed off after it has done its work.—L. K. G.

Staining and Filling Cheap Chairs.

Replying to Salinas y Rocha, Monterrey, N. L. Mexico, who asks in March issue of INDUSTRIAL FINISHING if it is possible to stain and fill cheap chairs by the dipping method, would answer that it is quite possible unless a very porous wood is used. Even then the filling can be done by dipping if the surplus is cleaned off afterward.

Not knowing the kind of wood on which the finish is to be made, nor the color of the stain to be used, it is difficult to give specific instructions applicable to the case. Assuming that the wood is not to be stained a very dark color, it is very easy to make a combination stain and filler that will not need to be cleaned off except at the points where the drip leaves the wood—provided the wood is not very porous and an oil stain is used. This can be done by adding 2 lbs. of paste filler to each gallon of stain, and keeping it thoroughly stirred during the process of dipping. This latter is necessary, and must be carefully attended to. Otherwise the filler will settle at the bottom of the dipping tank and as a result some parts of the stain will have too little filler, and others too much.

Water stain is not recommended for cheap chairs because it raises the grain of the wood and renders a great deal of sanding necessary to remove the fuzz. More than that, it is impossible to make a combination water-stain and filler. If water stain is used the filling must be done in a separate operation.

Some years ago, before the spray was developed to its present state of efficiency, the writer finished piano stools by the dipping process. This was high-class work, and we used a water stain, the method being as follows: The stools were first dipped in water stain; when dry the flat parts were rubbed with excelsior to remove the fuzz. They were then dipped in a mixture made of one part japan drier and four parts linseed oil. That sealed the pores of the wood. Then we applied by hand a surfacer made as follows: Mix 4-lbs. finely ground and sifted silex in one gallon of varnish and one quart of japan drier. Let stand 24 hours; then thin with turpentine to the consistency of thick cream and apply freely with a brush.

When the surfacer was dry the flat parts were sanded with very fine paper and dipped in varnish. By this method we cut the cost of finishing to less than one-half of what it had been formerly, and we produced a better finish. That method was adopted in many shops and it is still used in some except that the varnish is now

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applied with the spray instead of by dipping.

A similar method could be used in the case of the chairs made by Salinas y Rocha, or it could be changed according to the quality of finish desired. But as I said before, everything depends on the kind of wood, and the kind of finish desired.—J. C. Washbourne.

Always Wash New Cheese-Cloth Before Using.

I would like to comment on one point, and that has to do with the use of cheese-cloth in finishing operations. It has been referred to several times in INDUSTRIAL FINISHING, but I have never seen the precaution taken to mention that cheese-cloth should always be washed in water and dried before using the first time.

New cheese-cloth contains a sizing usually of starch, and unless this is washed out, it may cause trouble if the cheese-cloth were to be used on a completely finished surface. I have seen operations of wiping-up on polished pianos with unwashed cheese-cloth which caused much trouble and expense before the cause was determined. Difficulties have also been encountered in other branches of finishing. The result is usually a strange streakedness which resists the usual methods of cleaning. I think this might be interesting to some, for it is not as common knowledge as might be supposed.—P. S. Kennedy.

Primers for Lacquer

In the application of lacquer enamels to metal surfaces you will find two entirely different primers on the market, an oil primer and a lacquer primer. One company developed satisfactory primers for both of these methods and adopted the oil primer for the present, feeling that where bake ovens are used for the undercoats it would be more satisfactory, and that in the hands of the ordinary shop man it would be more fool proof.

The priming coat is usually followed by spot glazing, or knifing coat, after sanding one or more coats of rough stuff or sanding surfacer are applied, each coat being sanded. This is followed by at least three coats of lacquer enamel. The lacquer enamel is not rubbed or polished until the final coat is applied, however after spraying the first coat, if any serious surface defects are apparent they may be sanded out and the surface is then ready for final coats.

In finishing wood the surface is brought up with necessary stain and paste filler, then either shellaced and lacquered or finished with a coat of specially prepared undercoating and then lacquered. Either of these undercoats help build up the surface, act as a sealer for the stain and prevent softening action of the lacquer solvents on the filler.—E. R. K.

"Subox" is the name of a paint that is being marketed in Europe. It consists of colloidal lead made by an electrolytic process suspended in linseed oil. It is said to have great adhesive and rust preventive qualities and a greater covering capacity than ordinary red lead.

Lewis Varnish Mfg. Co. Buys.

F. J. Lewis Varnish Mfg. Co., Chicago, whose plant was recently destroyed by an explosion, has purchased the Newark, N. J., factory of the Butterworth-Judson Corporation.

Uniform Stains For Uniform Results.

There is one thing about stain that a great many finishers do not seem to understand—that there is a limit to the amount of stain powder which water will dissolve. When making dark colors, such as dark walnut or dark mahogany on birch or gum, it is too frequently the practice to try and obtain the desired depth of color with one coat of stain. To accomplish this the water is overloaded with stain powder. As a result, instead of dissolving, a great deal of the powder remains in suspension, and when the stain is applied to the wood it produces an effect more like a coat of thin paint than a coat of transparent stain. This applies to oil and spirit stains as well as to water stains.

Usually stains are dissolved under heat, and while warm they appear to be all right, but if the solvent is overloaded with powder there is a sediment when the stain cools. This is more frequently the case where the finisher tries to make a dark stain with cheap powders, which contain a considerable quantity of dextrine or other inexpensive fillers. The solvent becomes loaded with the filler, and cannot carry the stain.

Where a dark color is required, it is desirable to have it transparent. In order to have it transparent it is usually necessary to apply two coats of stain. The finisher seldom, if ever, has any purpose to serve by hiding the grain of the wood, even when he makes a very dark color. Every good finisher takes pride in the way he can draw out the figure of the wood. It is safer to make dark colors with two coats of stain, no matter how good the powder may be. Medium-dark colors can be made safely with one coat, if the stain is of the best quality.

It never pays to buy cheap stain powders, because in doing so one is paying for something that is not only absolutely useless, but sometimes injurious to the stain. Dextrine and similar fillers are useless in stain. They may be inexpensive but they cost money, nevertheless, and the buyer has to pay for them. A difference of ten percent in the price of stain may make a difference of 25 percent in the quality and strength of the stain. It does not require any very elaborate process of reasoning to prove that this is not economy.

Then there is the possibility of having work spoiled by inferior stains. I recall the case of a factory that had been using a stain the distributors of which have a worthwhile reputation for quality. The foreman finisher in this factory was a man of long experience. At regular intervals for nearly two years a traveling salesman called at that factory offering cheaper stains. The foreman finisher would not consent to making a change. One day the salesman called at the factory and left again without the foreman finisher being consulted. What he said to the manager I do not know, but I know he went away with an order for a quantity of stain powder.

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94 Worth St., New York
Works—Newark, N. J.

In due time the stain powder arrived. The foreman finisher started experimenting to get the correct shade of color, as the stain came in two colors—mahogany red, and mahogany brown. In time he got the right proportions, and started to use it. It was winter time, and one night the temperature of the shop dropped lower than usual. The following day, while the foreman was busy in another part of the department, the man at the stain went ahead with his work in the usual way. When the foreman visited the staining department he immediately saw that something was wrong with the stain. Examination showed that the low temperature of the night before had caused it to curdle. That little experience cost the firm more than a whole year's supply of good stain would have cost.

One of the reasons why foremen finishers turn gray prematurely, is the habit managers have of changing stains whenever they think they can save a penny, and then insisting on the finisher obtaining uniform results. If there was no difference in the stain there would be no difference in the price. No finisher can obtain uniform results with different stains. It is only fair to the finisher to give him stains of uniform quality.—Jules J. Thorne.

Making Up Formulas.

Every finishing foreman should have a laboratory in which he can do his mixing and his experimenting. In the laboratory he should have a scale and a set of measures, the former for weighing dry material, and the latter for measuring liquids. I once knew a foreman finisher who lost a good job

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because he thought he could "guess near enough" to the weight and measure of the materials he used in making up his formulas. He never had two batches of anything alike, and he never seemed to understand the reason why.

In purchasing a scale for weighing stain powders it should weigh from one dram up. For liquids a graduated glass may be used for quantities less than one pint; over one pint, use individual measures.

When preparing stains according to a formula, one should know what standard of weights and measures was used by the man who made the formula. When buying a scale one should also know whether the weights are Troy or Avoirdupois. The same applies to measures. In the U. S. the "wine measure" is in use; in Canada it is the Imperial measure. The former has 16 fluid ounces to a pint; the latter 20-oz. to a pint.

Of course if a man makes his own formulas with his own scale and measures, these differences make no difference to him when he mixes his stains. But when he gives these formulas out, and the one making up stains from them gets the weights and measures mixed up, the results are going to be far from what he hopes for.

The point on which I wish to lay stress is that of doing everything according to some system. Don't try to carry formulas in your mind. Write them out in a book kept for the purpose, and consult them whenever the information which they contain is to be used.—J. C. Werberg.

Profits only continue to come to those who continue to hustle.

Thinned "Blue Lacquer" As a Stain.

A stain suitable for any wood surface can be made by thinning "blue lacquer," which is not a nitro-cellulose lacquer but a lacquer similar to a "gloss oil proposition" and one that is miscible with turpentine, benzine, etc. Thin the "blue lacquer" to suit, with turpentine; apply it to samples the same as any other stain, and observe the effect after it is dry the next day. By using thinner and thicker mixtures one can get several different effects which are pleasing to the eye.

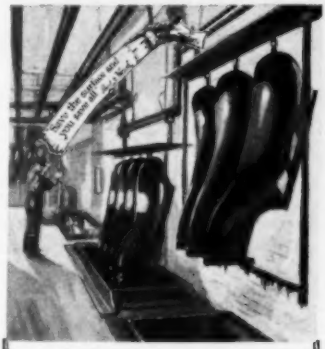
This stain may be applied to wood in the white, or on oiled or filled wood. Its covering capacity or depth can be manipulated to suit one's taste. When this stain is applied to a wood and rubbed off at once, it gives a very nice shade of dark oak color and it finishes off with a pretty hue. This "blue lacquer" is a product that is used in all implement manufacturing plants.—H. Schubert.

Water Marks on Waxed Finish.

Water left to lie on waxed finish results in a white spot; the water unites with the wax. To remove the spot rub with a rag moistened with alcohol, after which rub with a little sweet or linseed oil.—Moxite.

Philippine Mahogany.

Mahogany of the Philippine variety is a coarse-grained spongy wood that presents considerable difficulties in respect to finishing. Nevertheless it possesses a good figure and is being experimented with by a number of manufacturers of radio cabinets.



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New Mahogany Effects.

It is interesting to note the tendency to stop finishing mahogany in dull black effects, and to bring out a warmer brown shade that distinguishes the wood from walnut, and shows all the beautiful grain and figure.

Number 43 English Brown Mahogany Powder, soluble in water, gives this new brown tone, and also colors maple a fine shade.

It is worth while for foreman finishers to keep up with the newest effects, and by writing to W. D. Lockwood & Co., 314 W. 14th St., New York, they can get a sample of this stain for test.—Advertisement.

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94 Worth St., New York

Works—Newark, N. J.

A successful finish starts by sponging the wood with a glue size made up of 4-oz. animal glue dissolved in 2 gal. of hot water. When dry, the surface is sanded, water stained and allowed to dry thoroughly. Now apply filler; give 24 hours to dry, fill again, give 24 hours to dry, shellac, sandpaper and apply two or more coats of varnish.

When lacquer is used it will be desirable to allow the filler 48 hours to dry, unless the filler is of special make for use under lacquer, or unless forced drying equipment is available for ordinary filler. Most ordinary fillers, especially when they contain asphaltum, will turn gray under lacquer if not force dried or allowed an extra 24 hours of natural drying.

Under these conditions, speed in finishing with lacquer is somewhat discounted by the additional drying time necessary for the filler, but it is the only way to play safe all around. Oil stains are out of the question under lacquer, even with two coats of shellac, as the lacquer partially dissolves the shellac, and contact with the stain halts drying and clouds the film.

It is possible to use an oil stain where varnish is employed but the color effect will not be so brilliant and transparent as with a water stain, even though the glue sizing and sanding would be eliminated.—*J. M. Reade.*

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